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COPPER-MOLYBDENITE THERMO-COUPLE

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Molybdenite (MoS_2), the well known anisotropic semi-conducting crystal occurs in nature in the form of thin flakes parallel to the basal plane. In addition to its interesting electrical and magnetic properties its thermo-electric properties are also remarkable. The value of the thermo-electric power against copper is about a few hundred microvolts (Ogawa, 1928; Pierce, 1909) per degree within a range 0°C to 200°C, whereas that of a copper-constantan thermocouple is about $40\mu v$/degree near the room temperature. In order, therefore to investigate the possibility of using such a thermocouple for sensitive temperature measurement in connection with our studies of magnetic and electrical properties of solids, we constructed one Cu–MoS_2–Cu thermocouple.

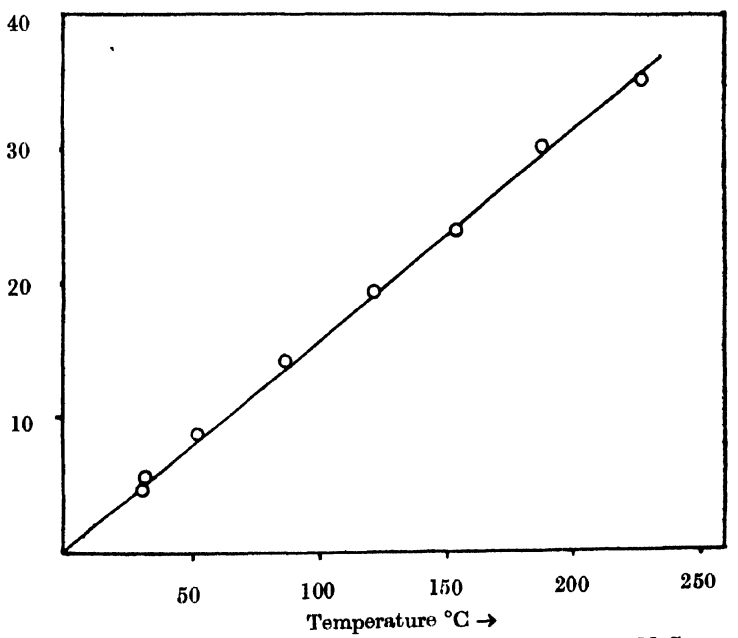

Fig. 1. Temperature Variation of Thermo E. M. F. in MoS_2.

A thin flake of a crystal of molybdenite of length of about 6 cms. was electro-plated with copper at the two ends and two copper wires of thermocouple variety

were soldered at the two plated ends using soft solder. One junction of this thermocouple was kept at 0°C and the temperature of the other was suitably varied, the entire length of the crystal excepting the plated portions being thoroughly lagged. The thermo e.m.f.'s were recorded potentiometrically upto a temperature of about 250°C and are represented in the adjoining figure. It is evident from the figure that the thermoelectric power is practically constant within this range of temperature and has a value of about 160μv/degree. Such a thermocouple may therefore be profitably utilised upto about 250°C. The possibility of its utilisation in low temperature measurements is under investigation and will be reported as soon as reliable results are obtained.

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REFERENCES

Ogawa, W. 1928, *J. Soc. Chem. Ind.* (Japan), **31**, 476.
Pierce, G. W., 1909, *Phys. Rev.*, **28**, 151.